Amendments to the Specification:

Please replace the paragraph beginning at line 13 on page 1 with the following amended paragraph:

More particularly, the present invention relates to a method and apparatus for searching multipaths of a mobile communication system at a higher speed by multiplying different channel weights on different ~~DPDCH~~ DPCCH energies in accordance with a spreading factor of the reverse dedicated physical data channel (hereinafter, it is referred to as DPDCH), given that a base station is aware of the spreading factor.

Please replace the paragraph beginning at line 18 on page 1 with the following amended paragraph:

In general, a reverse link dedicated physical channel (hereinafter, it is referred to as DPCH) in the mobile communication system is divided into the DPDCH for transmitting data and DPCCH for transmitting control information. The channels are multiplexed into I/Q ~~cord~~ code, respectively, in a separate wireless frame before they are received.

Please replace the paragraph beginning at line 17 on page 2 with the following amended paragraph:

The standards of Code Division Multiple Access (CDMA) in the asynchronous IMT-2000 system suggest that the base station transmit a pilot channel or a pilot symbol not only in a forward link but also receive one in a reverse link. Therefore, a receiver of the CDMA communication system based on the new standard should be able to conduct the search using the energy of the pilot signal both in the forward link and the reverse link.

Please replace the paragraph beginning at line 19 on page 3 bridging page 4 with the following amended paragraph:

Referring to Figure 2, a first multiplier 101 in the receiver for the traditional CDMA communication system separates an inputted signal through an antenna into I channel and Q channel, respectively, and the separated signal is filtered out at a Filter 102. Then a second multiplier 104 multiplies the filtered signal by a pseudo noise (PN) ~~cord~~ code generated by a pseudo noise ~~cord~~ code generator 108 of a searcher 103, and outputs the result. On the other hand, a complex output signal is synchronized and accumulated in a coherent accumulator 105. And, an energy detector 106 detects energy, and the detected energy is later accumulated in a ~~noncohent~~ noncoherent accumulator 107. Here, the accumulation procedure and the energy detection procedure are carried out in a branch to measure the intensity of power (energy) of the pilot channel.

Please replace the paragraph beginning at line 8 on page 9 with the following amended paragraph:

As shown in Figure 3, the searching apparatus of the present invention includes: a decimator 201 & 202 for conducting a decimation process on each inputted channel signal in a form of sample in a designated ratio; an input buffer 203 & 204 for storing an output of the decimator; a scrambling code generator 205 for generating a scrambling code signal according to a scramble code control signal; a complex despreader (HPSK) 206 for ~~dispreading~~ despreading the output of the input butter 203 & 204 into a complex signal, according to the scrambling code signal; a coherent accumulator 207 & 208 for multiplying the despread output by a pilot signal, and for coherently accumulating the multiplication in a pilot symbol section unit and in the other symbol section unit; an energy calculator 209 for calculating DPCCH energy values based on the coherent accumulation signal; a multiplier 210 for multiplying a number of pilot symbols of the DPCCH and the other symbols by an

appropriate weight, respectively; a noncoherent accumulator 211 for noncoherently accumulating an output of the multiplier; a search result storage 212 for sequentially storing the output of the noncoherent accumulator in the form of energy values; and a digital signal processor (DSP) 214 for outputting weights according to control of each unit and a pilot symbol, and for periodically storing the search energy values stored in the search result storage 212.

Please replace the paragraph beginning at line 8 on page 10 with the following amended paragraph:

In addition, if the data rate of the DPDCH signal is high, the signal intensity is high as well. Similarly, if the data rate of the DPDCH signal is low, the signal intensity is low. That is to say, the ~~data rate~~ signal intensity varies proportionally to the data rate. The receiver can find the data rate only if TFCI is received to 1 frame. Otherwise, there is no way that the receiver knows the data rate. In such case, the DPCCH comes in handy to search multipaths.

Please replace the paragraph beginning at line 14 on page 10 with the following amended paragraph:

Next, searcher control logic 213 conducts a search operation under the search enable signal (SEARCH_EN) and the search offset signal (~~SERCH_OFFSET~~ SEARCH_OFFSET, starting point of the search) of the digital signal processor 214. The DPCCH signal transmitted from the mobile station passes through the channel, and is filtered out as an I channel and Q channel through a receiver filter (Rx Filter). The filtered I or Q channel signal is inputted in each decimator 210 & 202, respectively, in a designated sample form (Chip*8).

Please replace the paragraph beginning at line 21 on page 10 with the following amended paragraph:

Each decimator 201 & 202 undertakes to decimate the channel signal to a designated ratio (chip*2) directed by a decimation position control signal (DEC_POS_CTL) that is outputted from the ~~digital signal processor 214~~ searcher control logic 213.

Please replace the paragraph beginning at line 24 on page 10 bridging page 11 with the following amended paragraph:

The output signal of the decimator 201 is saved in the input buffer 203 &204, respectively. And, the stored I and Q channel signal is then inputted in the complex despreader 206. The signal inputted in the complex despreader (HPSK: Hybrid Phase Shift Keying despreader) 206 is despread ~~to~~ using a scrambling code signal that is generated by the scrambling code generator 205 in which a scrambling code control signal (SCRAMB_INIT_LOAD) of the digital signal processor 214 is inputted.

Please replace the paragraph beginning at line 5 on page 11 with the following amended paragraph:

The coherent accumulator 207 & 208, under the direction of a coherent accumulation signal ~~(COH_ ACC C)~~ (COH_ACC_C) of the digital signal processor 214, multiplies the despread signal by a pilot signal (NPILOT), and integrates the whole pilot symbol section for coherent accumulation (i.e., 256Chip*N_{pilot}), and also integrates the other control symbol section by the symbol unit (i.e., 256Chip) for coherent accumulation.

Please replace the paragraph beginning at line 10 on page 11 with the following amended paragraph:

The energy calculator 209 squares the output result of the coherent accumulator 207 & 208 to calculate energy (I^2, Q^2). The calculated I and Q channel signals are summed up together ($I^2 + Q^2$), and the sum is inputted in the multiplier. The multiplier 210 multiplies the pilot symbol section of the DPCCH and the other unit symbol section by different ~~weight~~ weights (Wc: Wc1, Wc2) according to the pilot symbol section, ~~that~~ having been outputted from the digital signal processor 210, respectively.

Please replace the paragraph beginning at line 16 on page 11 with the following amended paragraph:

Here, the number of the ~~DPCCH"s~~ DPCCH pilot symbols is a variable section from 3 through 8, and it is arbitrarily selected. Supposing that the energy detectibility of the pilot section and the other section is different from each other, and that the intensity (or power) of the pilot symbol and the other control symbol is the same, the detection probability is considerably ~~high~~ higher as the number of pilot symbols increases. This is true especially when the speed of the mobile station is low.

Please replace the paragraph beginning at line 3 on page 12 with the following amended paragraph:

In addition, the multiplication of the weight is repeated using ~~the~~ a designated ~~this is as large as the~~ window size.

Please replace the paragraph beginning at line 5 on page 12 with the following amended paragraph:

Suppose that the number of specific pilot symbols is Pn, then the weight (Wc1) for the pilot section is Pn over {Pn + 1}, and the weight (Wc2) for the other section is 1 over {Pn + 1}, wherein the sum of two weights is 1, thereby complementing each other. For example, if the number of pilot symbols is 3, then the first weight (Wc1) will be 3/4, and the other weight (Wc2) will be 1/4. Again, if the number of pilot symbols is 4, then the first weight (Wc1) will be 4/5, and the other weight (Wc2) will be 1/5. Similarly, if the number of pilot symbols is 5, 6, 7 or 8, the first weight to be multiplied will be 5/6, 6/7, 7/8, or 8/9 in order, and the second weight to be multiplied will be 1/6, 1/7, 1/8 or 1/9, respectively.

Please replace the paragraph beginning at line 19 on page 12 bridging page 13 with the following amended paragraph:

The digital signal processor 204 reads the search energy ~~(SERCH_ENERGY)~~ (SEARCH_ENERGY) including the search energy value saved in the search result storage 212 periodically, and saves the energy in the internal buffer. At this time, the digital signal processor 214 also compares the search energy value saved in the internal buffer with the designated threshold. If the search energy value turns out to be greater than the threshold, the digital signal processor 214 inputs the search energy value in a sort block. The search energy value inputted in the sort block is then able to find timing information, that is offset from the window starting point, in order of high to low energy value as many as fingers.

Please replace the paragraph beginning at line 6 on page 13 with the following amended paragraph:

Referring to Figure 5, the DPCCH signal that passed through the mobile station's channel is inputted in the form of an I channel and Q channel at the receiving filter (Rx

Filter) (S501). The filtered I and Q channel signals are inputted in the decimator in the form of the designated sample (e.g., Chip*8), and the decimator, following the decimation position control signal (DEC_POS_CTL), outputted form the searcher control logic 214, decimates the sample to a certain ratio (e.g., Chip*2) (S502).

Please replace the paragraph beginning at line 12 on page 13 with the following amended paragraph:

The decimated I and Q channel signals are saved in each input buffer, respectively (S503), and afterwards, they are inputted in the complex despreader 206. Here, the scrambling code generator 205 outputs the scrambling code signal to the complex despreader 206, directed by the scramble code control signal (SCRAMB_INT_LOAD) of the digital signal processor 214. Then, the complex despreader 206 despreads the I and Q channel signals ~~to~~ using a scrambling code signal (S504).

Please replace the paragraph beginning at line 3 on page 14 with the following amended paragraph:

In other words, since the number of pilot symbols of the DPCCH generally has variable sections ranging from 3 through 8, a different weight for each variable section should be multiplied by the pilot section and the other symbol section, respectively. In this way, as the pilot energy gets higher, the detection probability gets higher as well. That is to say, when the mobile station's speed is low, the number of pilot symbols is proportional to the detection probability, given that the energy detectability of the pilot section and of the other section is different from each other and that the symbol intensity (or power) for the pilot and the other control symbol is the same.

Please replace the paragraph beginning at line 10 on page 15 bridging page 16 with the following amended paragraph:

With reference to Figure 6, the apparatus includes: a decimator 601& 602 for decimating each inputted channel signal in the form of the designated sample at the designated ratio; an input buffer 603 & 604 for storing an output of the decimator; a scrambling code generator 605 for generating a scrambling code signal under the direction of a scrambling code control signal; a complex despreader (HPSK) 606 for ~~dispreading~~ despreading the output of the input buffer 603 & 604 to a complex signal under the direction of the scrambling code control signal; a first channel energy searcher 607 for searching a first channel (DPCCH) energy by multiplying the despread output by a pilot signal and coherently accumulating the multiplication output; a second channel energy searcher 617 for searching a second channel (DPDCH) energy by calculating energy of the sum of output of the complex despreader 606 with each coherent accumulation that is dechannelized under an orthogonal variable spreading factor (OVSF), and by coherently accumulating the calculated energy; a first multiplier 612 for multiplying the output of the noncoherent accumulation of the first channel energy searcher 607 by a first channel weight; a second multiplier 622 for multiplying the noncoherently accumulated ~~first~~ second channel energy of the second channel energy searcher 617 by a second channel weight; an adder 625 for adding up the output of the first multiplier 612 and the output of the second multiplier 622; a search result storage 626 for storing a total value of the adder; a searcher control logic 627 for controlling each unit's channel searching operation; a digital signal processor 628 for outputting a different channel weight according to each unit's control and a spreading factor of a DPDCH, and for sequentially storing a channel energy search result saved in the search result storage 626.

Please replace the paragraph beginning at line 7 on page 16 with the following amended paragraph:

The first channel energy searcher 607 preferably includes [[a]] first and [[a]] second coherent accumulators 608 & 609 for multiplying each despread signal by the complex despreader 606 by the pilot signal, and for accumulating the multiplication output up to the entire pilot symbol section; a first energy calculator 610 for calculating DPCCH energy out of the coherent accumulation signal of the first and the second coherent accumulators 608 & 609; and a first noncoherent accumulator 611 for noncoherently accumulating output of the energy calculator 610.

Please replace the paragraph beginning at line 14 on page 16 with the following amended paragraph:

On the other hand, the second energy searcher 617 preferably includes [[a]] third and [[a]] fourth multipliers 615 & 616 for dechannelizing by multiplying each despread signal by the complex despreader 606 by the orthogonal variable spreading factor (OVSF) code 614 to distinguish channels; [[a]] third and [[a]] fourth coherent accumulators 618 & ~~819~~ <u>619</u> for coherently accumulating output of the third and the fourth multipliers 615 & 616, respectively; a second energy calculator 620 for calculating DPDCH energy out of the coherent accumulation signal; and a second noncoherent accumulator 621 for noncoherently accumulating output of the energy calculator 620.

Please replace the paragraph beginning at line 22 on page 16 with the following amended paragraph:

Still another method and an apparatus for searching multipaths of the mobile communication system according to another embodiment of the present invention is now explained with reference to <u>the</u> figures.

Please replace the paragraph beginning at line 25 on page 16 bridging page 17 with the following amended paragraph:

First of all, the digital signal processor 628 sends out a multipath search enable signal ~~(SERCH_EN)~~ (SEARCH_EN) to the searcher control logic 627, and outputs a search offset signal ~~(SERCH_OFFSET)~~ (SEARCH_OFFSET).

Please replace the paragraph beginning at line 3 on page 17 with the following amended paragraph:

At this time, the DPCH signal transmitted form the mobile station is filtered off ~~trough~~ through the receiving filter (Rx Filter) into an I channel and Q channel. And, the filtered I channel and Q channel is respectively inputted in the decimator 601 & 602 separately in the form of the designated sample (Chip *8).

Please replace the paragraph beginning at line 7 on page 17 with the following amended paragraph:

The decimator 601 & 602, under the direction of the decimation position control signal ~~(DEC_ POS-CTL)~~ (DEC_POS_CTL) of the searcher control logic 627, decimates the I channel and Q channel to the designated ratio (chip *2).

Please replace the paragraph beginning at line 3 on page 18 with the following amended paragraph:

The first energy calculator 610 calculates each energy value out of the coherent accumulation output of the first and the second coherent accumulators 607 & 609, and sums up the energy values, i.e., $I^2 + Q^2$, and then outputs the result. In addition, the first ~~noncoherent~~ noncoherently accumulator 611 ~~noncohrently~~ noncoherently accumulates the output of the first energy calculator 610 according to the noncoherent accumulation control

signal (NCOH_ACC_C). In other words, the pilot symbol section of the DPCCH and the other section's unit symbol section are ~~noncorehtnly~~ noncoherently accumulated, which is later used for searching the DPCCH's energy.

Please replace the paragraph beginning at line 19 on page 18 with the following amended paragraph:

Upon receiving the output of the third and the fourth multipliers 615 & 616, the third and the fourth coherent accumulators 618 & 619 ~~integrates~~ integrate the outputs and coherently ~~accumulates~~ accumulate them separately, which is done according to the coherent accumulation control signal (COH_ACC_D) of the digital signal processor 628. At this time, the third and the fourth coherent accumulators 618 & 619 check the DPDCH's spreading factor, and coherently ~~accumulates~~ accumulate the channel signals as much as the spreading factor size.

Please replace the paragraph beginning at line 17 on page 20 with the following amended paragraph:

In more detail, the relation between the spreading factor and the variable for determining a bit number per upper link DPDCH slot can be summarized to $SF_k = 256/2^k$, wherein k ranges from 0 through 6. Thus, if k is 0, the spreading factor is 256 ($SF_{k=0}$), and if k is 1, the spreading factor is 128 ($SF_{k=1}$), …, and if k is 6, the spreading factor is 4 ($SF_{k=6}$) and so forth.

Please replace the paragraph beginning at line 7 on page 21 with the following amended paragraph:

In short, as the spreading factor of the DPDCH gets larger, the first channel weight (Wc) to be multiplied by the DPCCH gets smaller, while the second channel weight (Wd) to

be multiplied by the DPDCH gets larger. Similar to before, the first channel weight (Wc) and the second channel weight (Wd) ~~that~~ vary ~~depening~~ depending on the spreading factor and are a complement to each other, and the sum of the two weights is 1.

Please replace the paragraph beginning at line 16 on page 22 with the following amended paragraph:

Each decimated signal to the designated ratio (Chip*2) at the decimator 601 &602 is saved in each input buffer 603 & 604 (S803), and the I and Q channels saved in the input buffer 603 & 604 are inputted in the complex despreader ~~(23a)~~ 606, in which they are despread to the scrambling code to be spread out (S804).

Please replace the paragraph beginning at line 15 on page 24 with the following amended paragraph:

Further, the energy of the DPDCH and the DPCCH transmitted ~~form~~ from the mobile station is detected, respectively. Depending on the ratio of detected energy values from each channel (DPDCH, DPCCH), different weights are multiplied to search the multipaths of the mobile station.

Please replace the paragraph beginning at line 19 on page 24 bridging page 25 with the following amended paragraph:

In conclusion, the method and the apparatus for searching multipaths of the mobile communication system according to the present invention are very effective especially when the base station does not know the spreading factor of the DPDCH, yet it needs to search multipaths of the multipaths of the reverse link in the asynchronous IMT-2000. To this end, the pilot section of the DPCCH and the other control symbol section are multiplied by different weights that are variable depending on the number of the pilot symbols and the

number of the other control symbols, thereby increasing the detection probability and searching multipaths more quickly. In doing so, the channel quality with information is greatly enhanced and the handoff can be speedily conducted.